Impacts of flap gate operations on simulated water levels upstream of temporary barriers

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Delta Modeling, DWR
Jan. 25, 2012
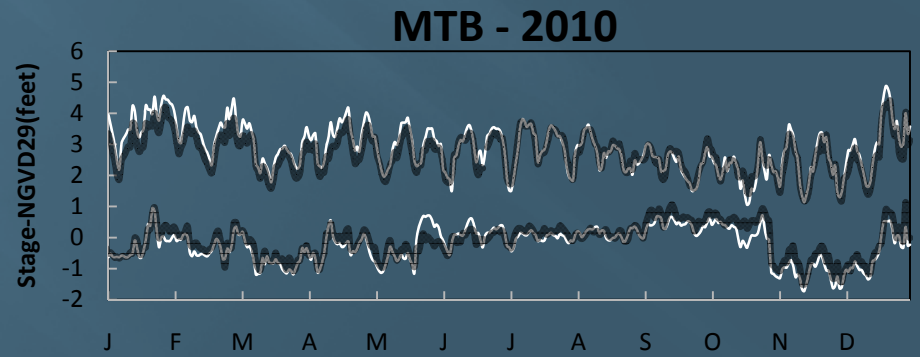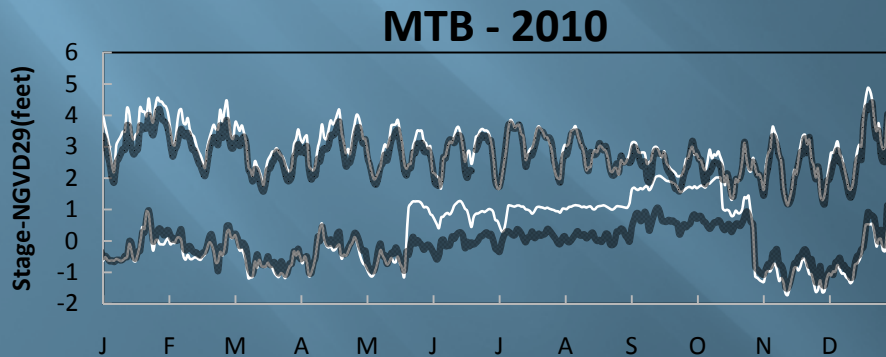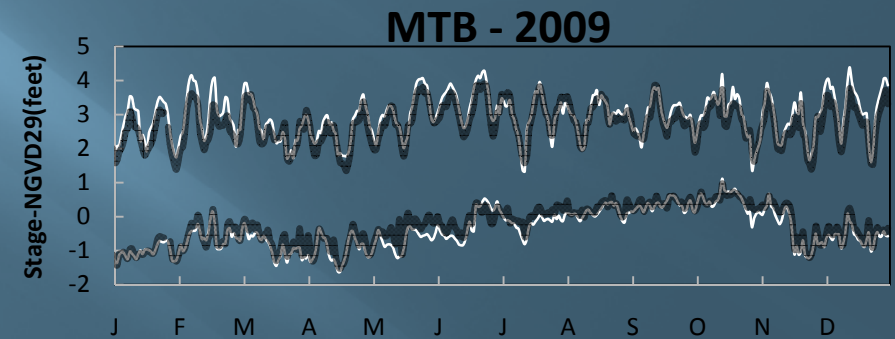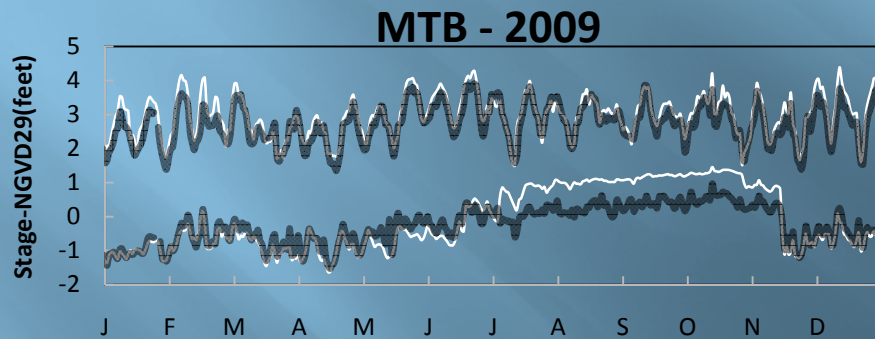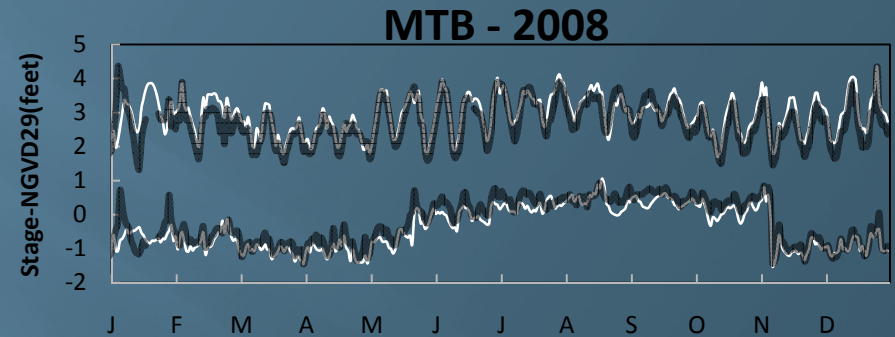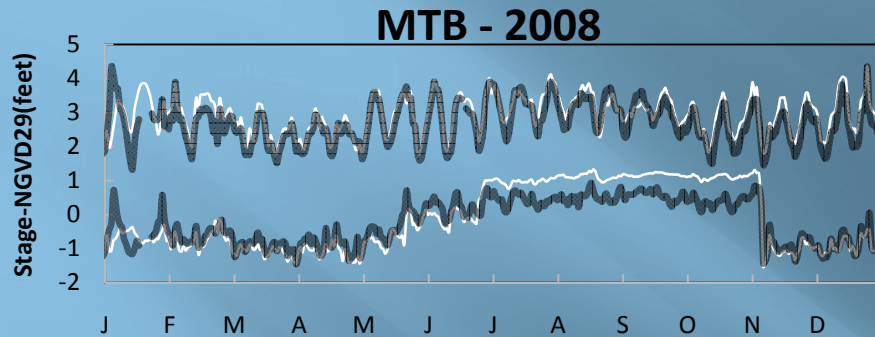
Background

1. South Delta temporary barriers:
    Middle River barrier
    Old River at Tracy barrier
    Grant Line Canal barrier
    Old River head barrier

2. The components of south Delta temporary barriers:
    Rockfill weir
    Pipes with tide-operated flap gates

3. The function of flap gates in the temporary barriers:
    Allow the water flow upstream , block the water flow
    downstream in order to raise the stage upstream of
    the temporary barriers

Upstream of Middle River Barrier

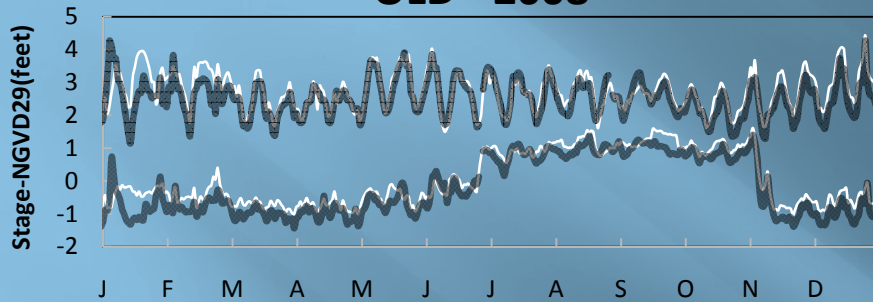## With flap gates simulated operating

W/O flap gates simulated operating

MTB - 2008

Stage-NGVD29(feet)

5 4 3 2 1 0 -1 -2

J F M A M J J A S O N D

MTB - 2008

Stage-NGVD29(feet)

5 4 3 2 1 0 -1 -2

J F M A M J J A S O N D

MTB - 2009

Stage-NGVD29(feet)

5 4 3 2 1 0 -1 -2

J F M A M J J A S O N D

MTB - 2009

Stage-NGVD29(feet)

5 4 3 2 1 0 -1 -2

J F M A M J J A S O N D

MTB - 2010

Stage-NGVD29(feet)

6 5 4 3 2 1 0 -1 -2

J F M A M J J A S O N D

MTB - 2010

Stage-NGVD29(feet)

6 5 4 3 2 1 0 -1 -2

J F M A M J J A S O N D

Upstream of Old River at Tracy Barrier

With flap gates simulated operating

OLD - 2008

OLD - 2009

OLD - 2010

W/O flap gates simulated operating
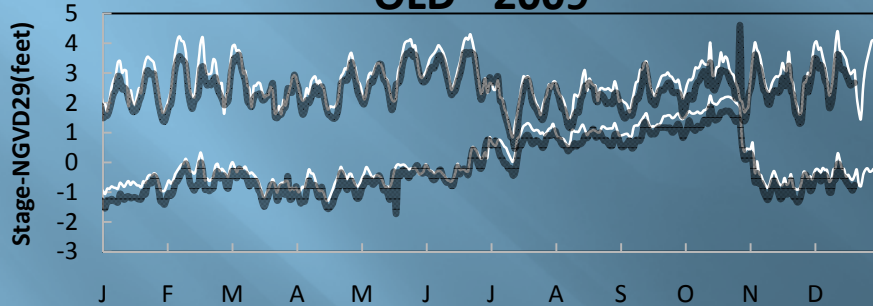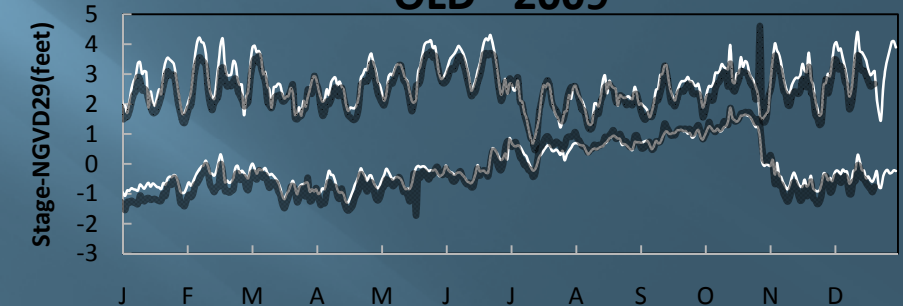
OLD - 2008

OLD - 2009

OLD - 2010

Upstream of Grant Line Canal Barrier
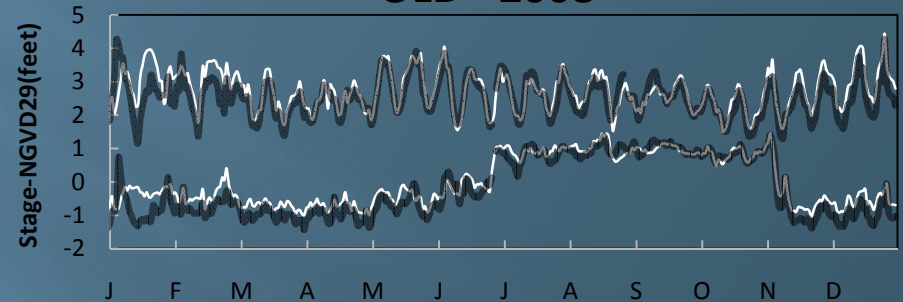
With flap gates simulated operating

W/O flap gates simulated operating

DGL - 2008

DGL - 2008

DGL - 2009
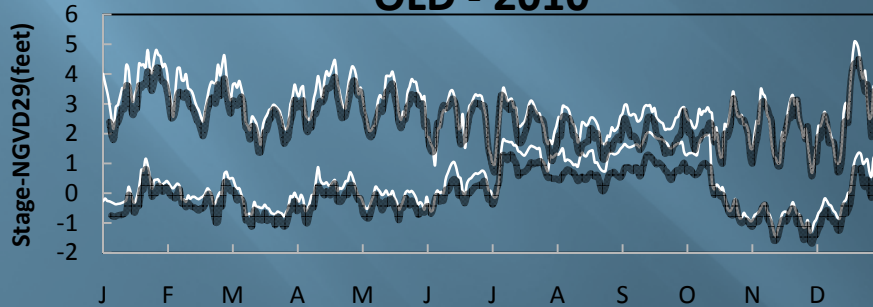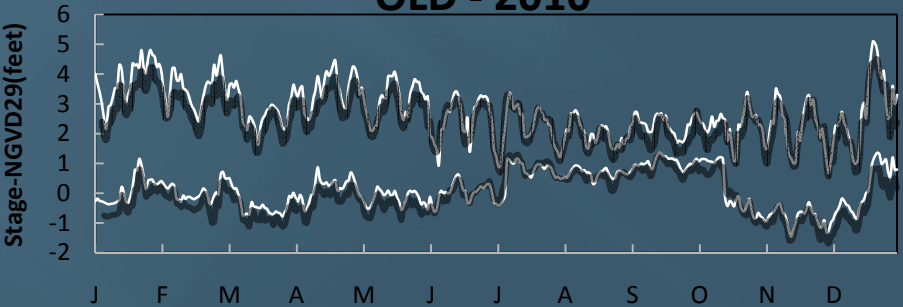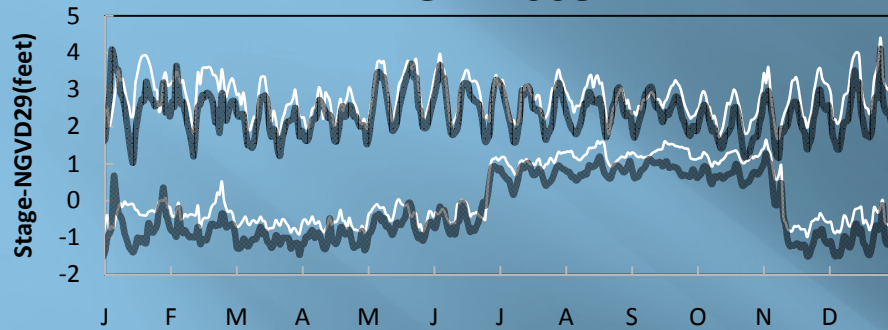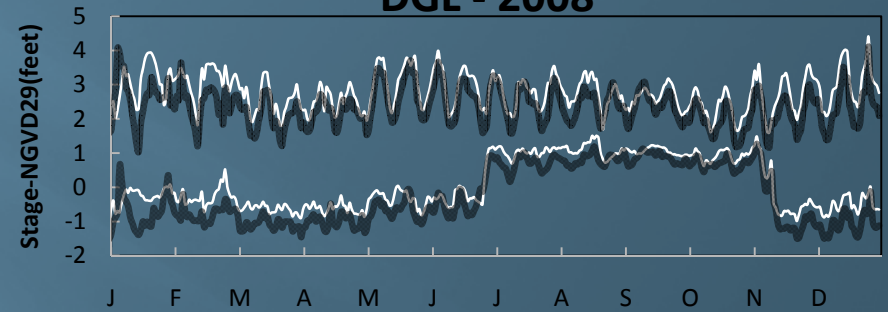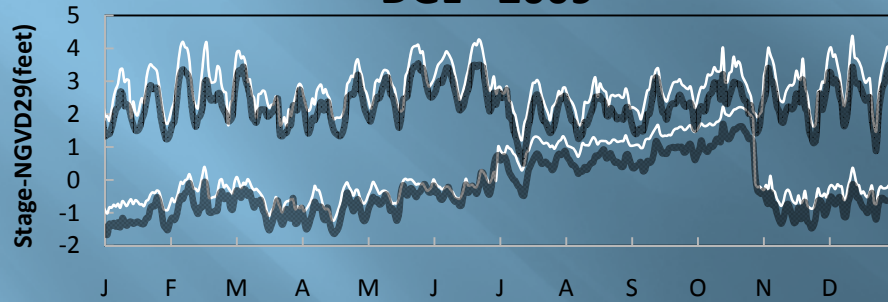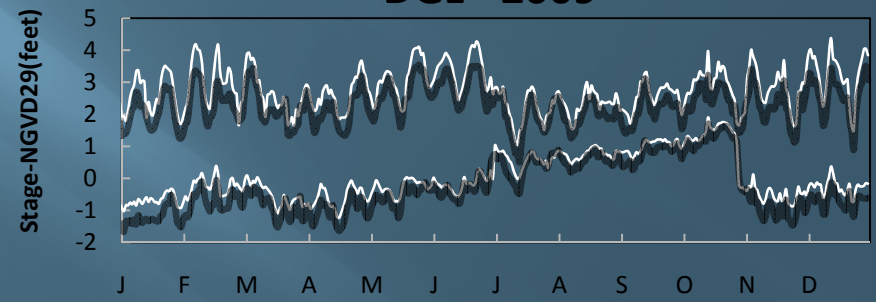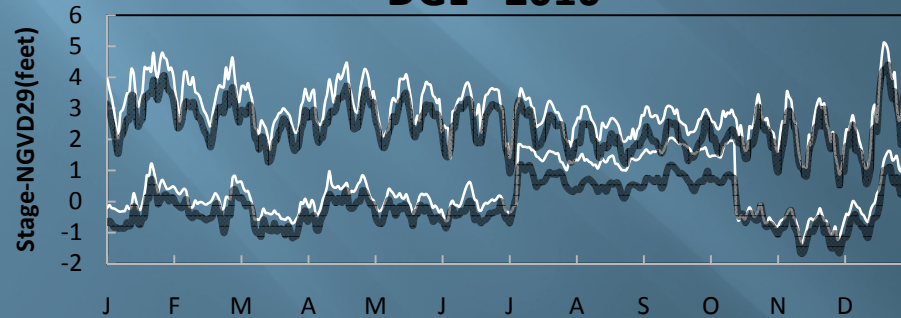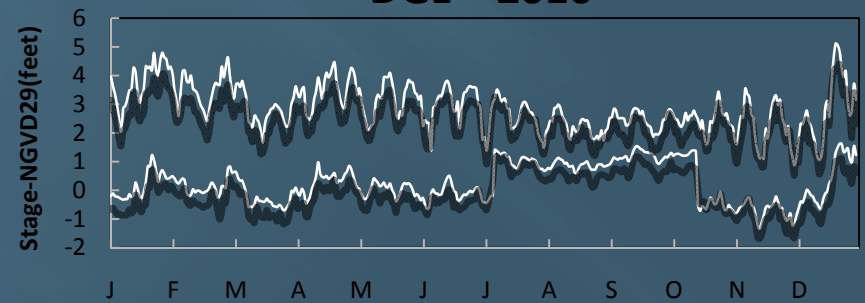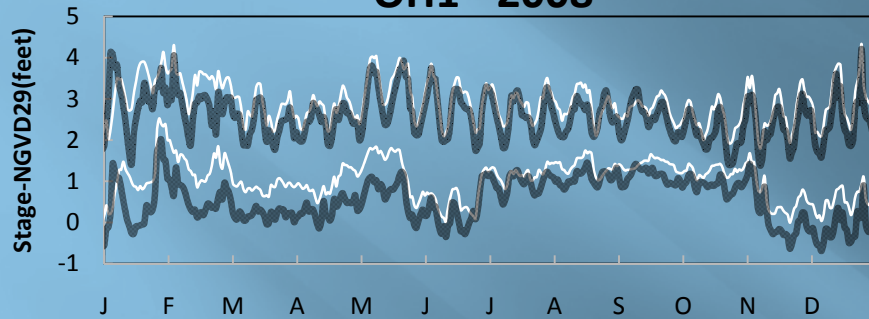
DGL - 2009

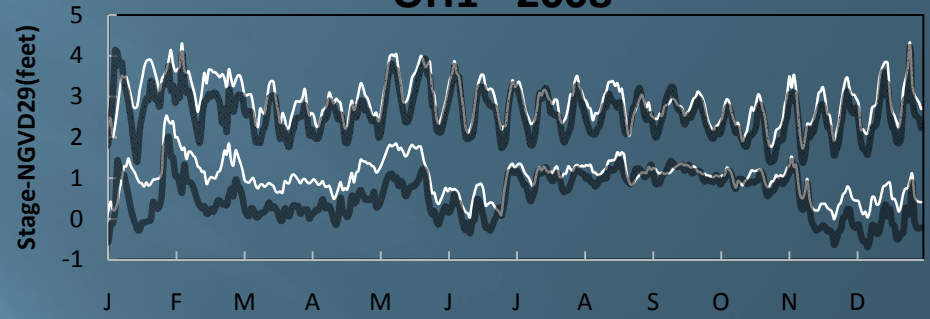DGL - 2010

DGL – 2010

Upstream of Old River Head Barrier

With flap gates simulated operating
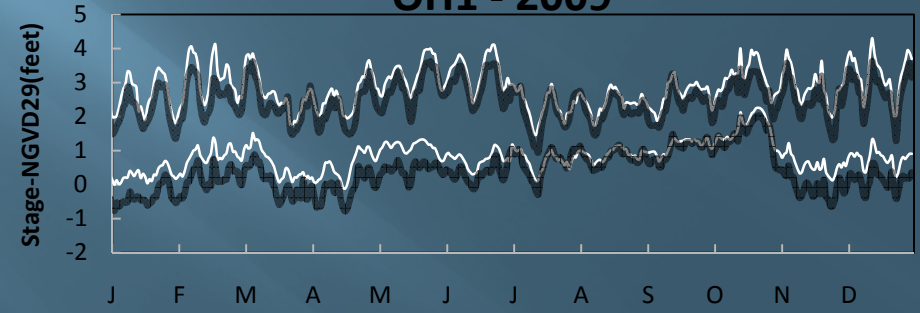
W/O flap gates simulated operating
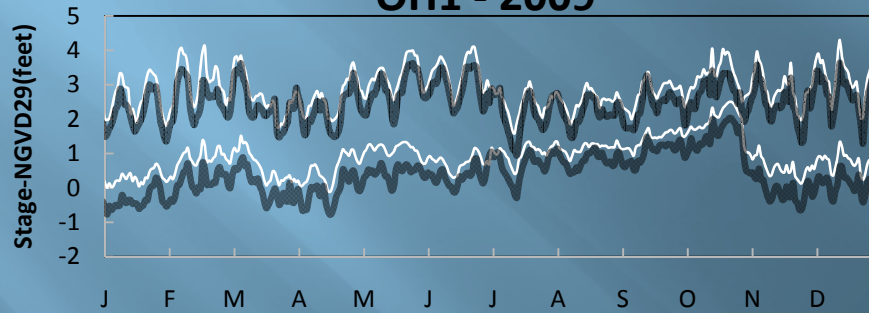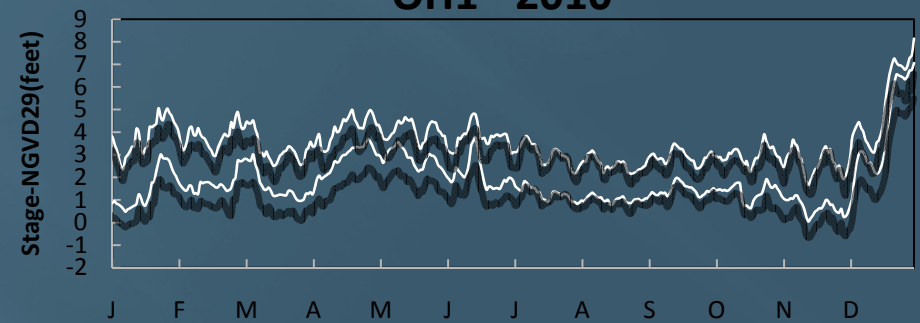
Conclusion:

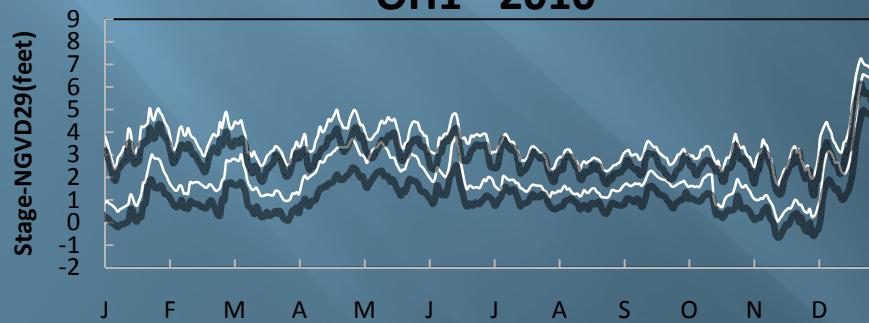Simulating the temporary barriers without flap gates operating typically yields minimum water level upstream of barriers which better match observed data.

Possible reasons:

1. Field data might be wrong.

2. DSM2 might not catch the actual physical structure of the barrier system.

3. The flap gates don't fulfill their function. They might allow water go through all the time or block water totally.